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TREATMENT OF VOCAL TICS IN CHILDREN WITH TOURETTE SYNDROME: INVESTIGATING THE EFFICACY OF HABIT REVERSAL

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Habit reversal was used to treat vocal tics in 5 children with Tourette syndrome. Vocal tics were reduced in 4 of the 5 children, the untreated motor tics did not increase, and treatment was acceptable to the children's parents.

DESCRIPTORS: habit reversal, Tourette syndrome, vocal tics

Tourette syndrome is a neurobehavioral disorder involving motor and vocal tics that occur consistently over the course of at least 1 year. Although the disorder is typically treated with medication, habit reversal (HR) is a nonpharmacological alternative with a history of success in reducing motor tics associated with chronic tic disorder and Tourette syndrome. There is, however, a dearth of studies evaluating the efficacy of HR for vocal tics (Woods, 2001). The present study was conducted to determine if HR is effective in treating vocal tics in children with Tourette syndrome.

METHOD

Participants

Five Caucasian boys with a diagnosis of Tourette syndrome and an IQ above 70 participated. According to the Yale Global Tic Severity Scale (Leckman et al., 1989), 2 boys had a mild form of the disorder (Ben and Raoul), 1 boy had a moderate form (Frank), and 2 boys presented with a moderate to severe form (Don and John).

Don was 11 years old and had been engaging in motor and vocal tics for over 2 years. His motor tics included head jerking and eye blinking, and his vocal tics included coughing and grunting. John was 10 years old and had been engaging in tics for 4 years. John's motor tics included neck stretching, arm extension, and head jerking, and his vocal tics included rapid exhaling, squeaking noises, and throat clearing. Ben was 13 years old and had exhibited tics for over 1 year. Ben's motor tics included eye blinking and mouth movements, and his vocal tics included throat clearing and grunting. Raoul was 12 years old and had been engaging in tics for 1.5 years. Raoul's motor tics included eye blinking, nose movements, and mouth movements, and his vocal tic was grunting. Frank was 12 years old and had diagnoses of Tourette syndrome and major depression. He had been engaging in motor and vocal tics for 5 years. Motor tics included eyebrow raising and shoulder rolling, and vocal tics included throat clearing, sniffing, and coughing. Frank was taking pimozide (1 mg/day) and fluoxetine (40 mg/day) throughout the study.

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Data Collection

The participants were videotaped in their homes by research assistants. Ben's parents conducted Ben's recordings because they lived some distance from the university. The children were recorded alone for 15 min in a stable setting identified by the participant's parents as one in which the tic frequently occurred. A trained observer scored the segments separately for motor and vocal tics using a 10-s partial-interval scoring method (except for Frank, for whom a 30-s interval was used). Operational definitions were created for each participant's tics and are available from the first author. Interobserver reliability was conducted on 29.6% of sessions, with mean agreement of 98.6% and 99% for motor and vocal tics, respectively.

Procedure

The impact of HR on vocal tics was evaluated using a nonconcurrent multiple baseline across subjects design. Each participant was assigned to a predetermined number of baseline sessions.

Treatment. Vocal tics were targeted for treatment. Treatment followed a three-session format (Twohig & Woods, 2001; Woods, 2001). During an initial 1-hr treatment session, HR was initiated for all vocal tics and included awareness, competing response, and social support training. The competing response involved diaphragmatic breathing for 1 min contingent on the vocal tics or their antecedents. The initial session was followed by one session per week over the next 2 weeks, during which the treatment was reviewed and practiced. Within 1 week of the final treatment session, the participant's parents completed a measure of treatment acceptability. Follow-up assessments were conducted 3 months after treatment.

RESULTS AND DISCUSSION

Four of the 5 children exhibited immediate reductions in vocal tics upon the implementation of habit reversal (see Figure 1). Don's vocal tics dropped from $M = 54.9\%$ at baseline to $M = 1.7\%$ during treatment and remained low at the 3-month follow-up ($M = 2.5\%$). John's vocal tics dropped from $M = 30.1\%$ at baseline to $M = 5.8\%$ during treatment. However, because his parents observed poor treatment compliance, John received a booster session during which a plan was established to use tangible items to reinforce his use of the competing response. At follow-up, John and his parents were no longer using the reinforcement program and his vocal tics had increased to $M = 40.55\%$ of intervals. Ben's vocal tics decreased from $M = 43.8\%$ at baseline to $M = 9.1\%$ upon implementation of HR. At the 3-month follow-up, Ben's vocal tics occurred during $M = 1\%$ of intervals. Raoul's vocal tics decreased from $M = 8.2\%$ at baseline to $M = 1.8\%$ during treatment. At the 3-month follow-up, Raoul's vocal tics occurred during $M = 1\%$ of intervals. Only 1 child did not improve as a result of HR. Frank's vocal tics occurred during $M = 14.8\%$ of baseline intervals and fell to $M = 9.2\%$ throughout treatment and $M = 1.6\%$ at follow-up. However, the failure of the vocal tics to decrease immediately after treatment was implemented calls into question the actual impact of the intervention.

The untreated motor tics decreased in 1 child (Don) and did not change in the remaining children. Don's motor tics decreased from $M = 34.1\%$ at baseline to $M = 6.75\%$ during treatment and $M = 0\%$ at follow-up. High variability in John's data clouded any mean changes from baseline ($M = 21.3\%$) to treatment ($M = 8.9\%$) and follow-up ($M = 10.5\%$). Ben's motor tics did not change from baseline ($M = 3.1\%$) to treatment ($M = 4.1\%$) or follow-up (M

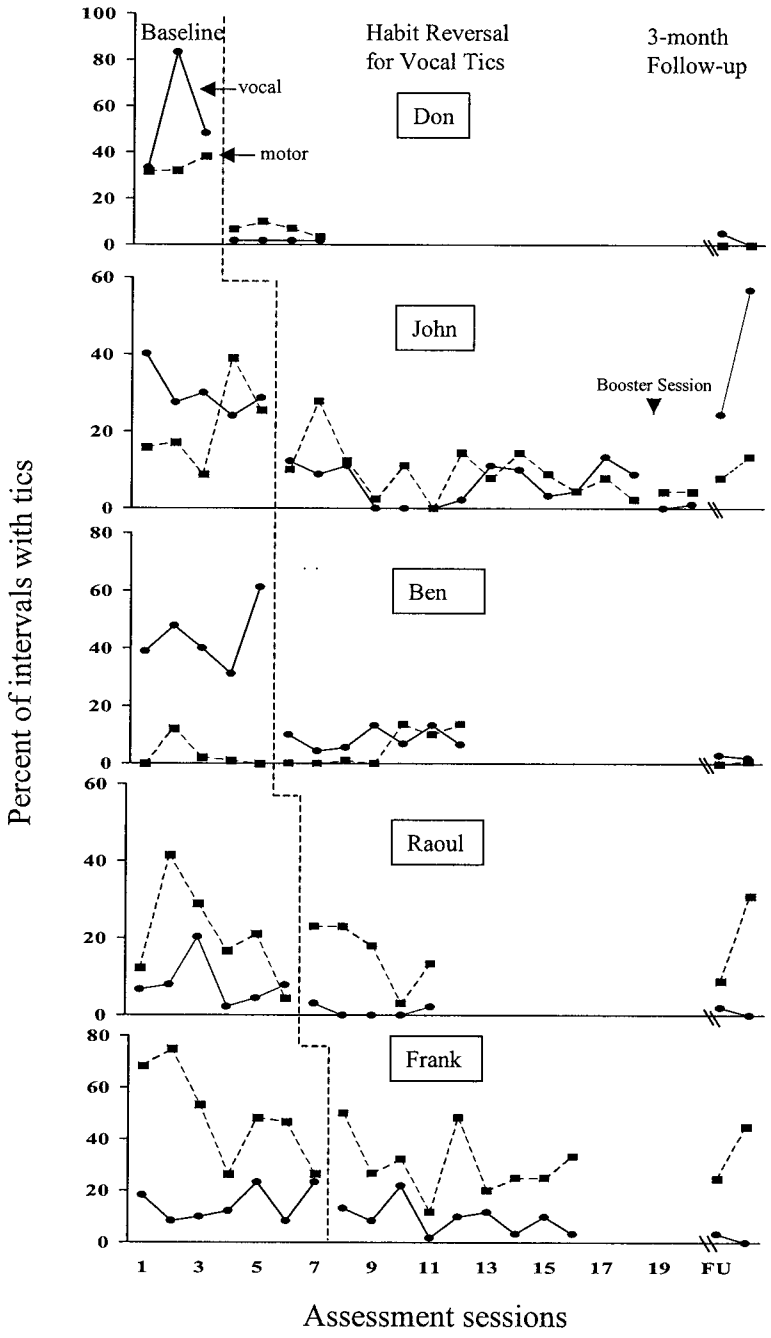

Figure 1. Percentage of intervals with motor and vocal tics across participants. The dashed line represents the completion of the initial 1-hr treatment session. Data points presented after the dashed line were collected prior to and following the remaining two treatment sessions.

= 1%). Raoul's motor tics also did not change appreciably from baseline (M = 20.8%) to treatment (M = 14.8%) or follow-up (M = 20%). Although the mean change in Frank's motor tics from baseline (M = 49.2%) to treatment (M = 28%) appears substantial, the decreasing trend occurring during baseline suggests that motor

tics did not appreciably change when the vocal tics were treated. At the 3-month follow-up, Frank's motor tics were occurring during $M = 35\%$ of intervals.

An overall summary of the data reveals an 82% reduction in vocal tics during treatment with no concurrent increase in motor tics. Likewise, the results were maintained at the 3-month follow-up for 3 of the 5 children, and the parents of all 5 participants found HR to be an acceptable intervention. Future research should incorporate designs with stronger controls, assessments of generalizability, and measures of treatment compliance.

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